

DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
ACTIVITY REPORT: Scheduled Inspection

P038438063

|  |                               |                           |
|--|-------------------------------|---------------------------|
| FACILITY: American Rack Company                |                               | SRN / ID: P0384           |
| LOCATION: 4910 Kraft Ave SE, GRAND RAPIDS      |                               | DISTRICT: Grand Rapids    |
| CITY: GRAND RAPIDS                             |                               | COUNTY: KENT              |
| CONTACT: Duane Davis, Shop Supervisor          |                               | ACTIVITY DATE: 12/22/2016 |
| STAFF: David Morgan                            | COMPLIANCE STATUS: Compliance | SOURCE CLASS: SM OPT OUT  |
| SUBJECT: Inspection and Stack Test Observation |                               |                           |
| RESOLVED COMPLAINTS:                           |                               |                           |

At 7:30 A.M. on December 22, 2016, Air Quality Division staff Dave Morgan conducted a scheduled inspection and a stack test observation of American Rack Company (ARC) located at 4910 Kraft Avenue in Cascade Township. The purpose of the inspection was to verify the company's compliance with state and federal air pollution regulations, Permit to Install (PTI) Nos. 151-12 and 151-12A and to verify process operations during the stack test. Accompanying AQD staff on the inspection was Duane Davis, ARC Shop Supervisor and briefly Todd Oskroba, ARC Manager. Other AQD staff on site were Tom Gasloli of the Technical Programs Unit. Stack testers were Mason Sakshaug of B-Tec Inc and Dakota Soule of PRISM Analytical. Matt Zomberg, ARC Operations Manager, assisted with record requests after the inspection.

**FACILITY DESCRIPTION**

ARC refurbishes part racks used in the electroplating process. The part racks are dipped in plastisol to protect the metal racks. The company strips off the old plastisol coating on the racks using a burn-off oven, then knocks off the remaining ash. The racks are then refurbished and recoated with plastisol. The burn-off oven is covered under PTI No. 151-12 while the coating operation is covered under PTI No. 151-12A. The facility has opt-out limits for hazardous air pollutants (HAPS).

**COMPLIANCE EVALUATION**

**Rack Burn-Off Oven (EUBURNOFF):**

Under PTI 151-12 the company operates a natural gas-fired Guspro rack burn-off oven (EUBURNOFF) to remove the existing plastisol coating from racks that they refurbish. At the time of the inspection (during the test) the equipment was operating in a normal manner with about 200 pounds being burned off during the oven batch. According to Mr. Davis, the unit operates once per day with a typical batch running approximately 8 hours with about 1 hour for heat up and 1 hour for cool down. The primary chamber is operated under two different soak cycles. The typical cycle runs with an oven temperature around 450°F for eight hours. A second cycle that is run less often has an oven temperature around 800°F with a four hour operating time.

There is a secondary afterburner with an automatic temperature control system and interlock as required by the permit. There is also a circular chart used to record the temperature. At the time of the inspection, the afterburner temperature was operating around 1,450 °F which is above the minimum temperature limit of 1,400°F. The primary chamber temperature reached an operating temperature around 450 °F. Additional discussion about the oven operation during the test is below in the 'Stack Test' section.

The permit requires that the primary and secondary chamber thermocouples be calibrated once per year. These thermocouples were last calibrated by Consolidated Controls Inc. in May 2016. In addition, the company had temperature chart records which AQD staff reviewed on site and no problems were noted.

Stack dimensions appeared to meet the minimum height requirement of 29 feet and the maximum diameter of 16 inches. No changes from the last AQD inspection were observed. There were also no visible emissions observed from the stack.

Under PTI No. 151-12 the company can not exceed 220 batches per year. Company records from December 2015 through November 2016 show that 212 batches were processed which is below the permit limit of 220 batches per 12-month rolling time period. In addition, hydrogen chloride (HCl) emissions (based on an emission factor established during the May 2013 stack test) for the period from December 2015 through November 2016 were 2,934 pounds (or 1.46 tons) which is below the 9.0 ton permit limit for an individual hazardous air pollutant. The May 2013 stack test determined HCl emissions to be 1.73 pounds per hour which is below the permit limit of 16.33 pounds per hour. It is noted that HCl emission factors determined during the December 2016 stack test will need to be used to verify compliance with permit limits in the future. Records obtained during the inspection are attached.

**Sandblasting:**

There is one sandblasting booth that is fully enclosed with no exhaust out of the booth. This equipment is exempt under Rule 285(l)(vi)(B).

**Primer Dip Coating:**

The first step in the plastisol coating process is the primer application. A soap solution is pasted on the rack part clips and is readied for priming. The rack is dipped into a 650 gallon rectangular tank containing a primer and methyl ethyl ketone (MEK) mixture. The tank is not in a booth, however, there is a hood and air handling system vented to the ambient air. There are no exhaust filters, however, no atomization of the coating occurs. The primer tank in addition to the other units in the coating line is permitted under PTI No. 151-12A. After the rack is primed, it is placed in the curing oven for a pre-heat curing cycle for around 30-40 minutes at approximately 535°F before the final plastisol coat is applied. The lid of the primer tank was closed when not in operation.

The primer coat consists of a 50/50 mixture of MEK and Chemionics C-1445 plastisol primer. The total primer usage from December 2015 through November 2016 was 178 gallons (the highest monthly usage was 21.11 gallons in April 2016). The total VOC content of the primer mixture is calculated to be around 7.83 pounds per gallon. Based on company data, the company had the following emissions from the primer tank for December 2015 through November 2016:

| Pollutant                 | Actual Emissions         | Limit    | Compliance? |
|---------------------------|--------------------------|----------|-------------|
| VOC                       | 1,396.73 lbs (0.69 tons) | 3.2 tons | Y           |
| MEK                       | 768.2 lbs (.38 tons)     | 9.0 tons | Y           |
| Toluene                   | 349.2 lbs (.17 tons)     | 9.0 tons | Y           |
| Ethylene Glycol Monoether | 139.4 lbs (0.07 tons)    | 9.0 tons | Y           |
| Butanol                   | 139.4 lbs (0.07 tons)    | 9.0 tons | Y           |

**Plastisol Coating:**

After pre-heating, the heated racks are dipped into a 2,300 gallon rectangular tank containing black plastisol and plasticizer which is used as a reducer. Plastisol from 275 gallon bulk totes and a small amount of plasticizer is added to the tanks on an as needed basis. After an initial coating of plastisol, the rack is placed in the cure oven. ARC uses Loes Enterprises plastisol coating which according to the safety data sheet is non-volatile and contains no VOCs. Therefore, the VOC emissions from the plastisol are expected to be 0.0 pounds.

Records show that plastisol coating usage from December 2015 through November 2016 was 4,318 gallons (or 43,315 pounds). The highest monthly usage was 552.24 gallons (5,539 pounds) in August 2016. Again, VOC emissions from the plastisol dipping process are expected to be 0.0 pounds.

**Curing Oven:**

After the racks have been initially coated with plastisol, the racks are cured (or fused) in an oven for around three minutes at approximately 440°F. The oven is natural gas-fired, has a fuel rating of 3.5 million Btu per hour, an exhaust rate of 2,000 cubic feet per minute and has a secondary afterburner. Once the racks are flash cured, they are pulled out and re-coated. After the second coat is applied racks are placed in the oven for final cure around 390°F ±10-15°F for about 40 minutes. The maximum load for the oven consists of two carts with two racks per cart. The oven is designed with a maximum operating temperature of 500°F and has a over temperature shutdown at 590°F.

Exhaust gases from the primary oven chamber are vented through a secondary afterburner which operates at a set point of 1,425°F. The secondary afterburner is installed to control smoke from the process. In addition, there is a hood installed above the doors to the oven to capture any potential smoke emitted when the doors are cracked after the curing cycle is complete. Any smoke that is captured is vented through the secondary afterburner. No visible emissions observed from the oven stack.

Stack dimensions appeared to meet the minimum height requirement of 29 feet and the maximum diameter of 16 inches.

**Welding:**

The company has some welding stations that are exempt under Rule 285(i).

**Stack Testing:**

Stack testing was being conducted on EUBURNOFFOVEN as requested by the AQD in April 2016. The purpose of the stack testing was to determine the HCl emission rate (in pounds per hour). Testing was being conducted under U.S.EPA Method 320 using Frouier Transform Infrared Spectroscopy (FTIR). The test was being conducted over the entire eight hour oven batch cycle.

Racks were weighed prior to being loaded into the oven. According to ARC, routine production is around 200 pounds per rack. Mr. Davis indicated that the oven was loaded with a routine maximum number of racks. After the burn cycle, the company also weighed the racks. Records indicate that about 184 pounds of plastisol was burned off. Records are attached.

At 9:40 AM, AQD staff observed start-up of the oven. The afterburner temperature rose to above 1,400°F, and then fluctuated between 1,420°F and 1,520°F. After approximately 60 minutes, the primary oven burner had still not ignited. AQD staff determined that the gas valve to the primary oven burner was closed. Once ARC staff opened the valve, the primary oven temperature began to rise around 11:13 AM. A copy of the temperature chart from the test is attached.

Since the FTIR method allows for the direct analysis of the exhaust gases, the HCl concentration could be monitored in real time. A steady increase in HCl emissions was observed on the analytical equipment. At 12:27 P.M. the HCl concentration was 1,521 parts per million (ppm) at a primary oven temperature of 450°F. At 1:00 P.M. the HCl concentration was around 2,734 ppm at 450°F. HCl emissions appeared to peak at this time. No production problems were noted during testing and the afterburner was operating at a compliant temperature.

The company has 60 days to submit official results of the test.

SUMMARY

ARC is in compliance with the applicable requirements evaluated.

NAME 

DATE 1/5/17

SUPERVISOR 